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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/742,224	12/22/2000	Walx Fang	4425-102	7196

7590 08/14/2003

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EXAMINER	
BARAN, MARY C	
ART UNIT	PAPER NUMBER
2857	

DATE MAILED: 08/14/2003

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)	
	09/742,224	FANG ET AL.	
	Examiner	Art Unit	
	Mary Kate B Baran	2857	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *21 May 2003* .

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-8 and 10-20* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-8 and 10-20* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☒ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on *22 December 2000* is/are: a)☐ accepted or b)☒ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

11)☐ The proposed drawing correction filed on _____ is: a)☐ approved b)☐ disapproved by the Examiner.

If approved, corrected drawings are required in reply to this Office action.

12)☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. §§ 119 and 120

13)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____ .

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

14)☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).

a) ☐ The translation of the foreign language provisional application has been received.

15)☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO-1449) Paper No(s) _____ .
4) ☐ Interview Summary (PTO-413) Paper No(s). _____ .
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other:

DETAILED ACTION

Response to Amendment

1. This action is responsive to the Amendment filed on 21 May 2003. Claims 1-8 and 10-20 are pending. Claims 1, 2, 12, 17 and 19 have been amended. Claim 9 has been cancelled.

2. The amendments filed on 21 May 2003 are sufficient to overcome the prior claim objections.

Drawings

3. The drawings are objected to because in Figure 2 block 21 and Figure 3 block 31, the term "integrate" should be – integrated –. A proposed drawing correction or corrected drawings are required in reply to the Office action to avoid abandonment of the application. The objection to the drawings will not be held in abeyance.

Specification

4. The specification has not been checked to the extent necessary to determine the presence of all possible minor errors. Applicant's cooperation is requested in correcting any errors of which applicant may become aware in the specification.

5. A substitute specification in proper idiomatic English and in compliance with 37 CFR 1.52(a) and (b) is required. The substitute specification filed must be accompanied by a statement that it contains no new matter.

Claim Rejections - 35 USC § 112

6. The following is a quotation of the first paragraph of 35 U.S.C. 112:

> The specification shall contain a written description of the invention, and of the manner and process of making and using it, in such full, clear, concise, and exact terms as to enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make and use the same and shall set forth the best mode contemplated by the inventor of carrying out his invention.

Claims 1-8 and 10-20 are rejected under 35 U.S.C. 112, first paragraph, as failing to comply with the enablement requirement. The claim(s) contains subject matter which was not described in the specification in such a way as to enable one skilled in the art to which it pertains, or with which it is most nearly connected, to make and/or use the invention.

It is not clear from the specification what the "test time function" and "real time function" are or what they represent. Furthermore, the term "real time function" is not consistent with the terminology currently used in the art, as "real time" means happening in real time or in the present.

It is also not clear how the acceleration factor transforms between a "test time" and a "real time". Transformation is used to switch between two domains, such as switching between the time and frequency domains; however, Applicant argues transforming between a "test time function" and a "real time function" using an

acceleration factor. The best burn-in time is then based on a distribution of the operating life of the chip.

Furthermore, it is not clear how the acceleration factor relates the "test time function" to the "real time function".

Claim Rejections - 35 USC § 103

7. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

Claims 1-8, 11-15 and 18 are rejected under 35 U.S.C. 103(a) as being unpatentable over Boyington et al. (U.S. Patent No. 6,377,897) (hereinafter Boyington) in view of Chien et al. ("A Nonparametric Approach to Estimate System Burn-in Time") (hereinafter Chien).

Referring to claims 1 and 12, Boyington discloses providing a plurality of integrated circuits (see Boyington, column 3 lines 31-33); performing a life-time testing process, wherein a failure rate testing time relation is established by measuring the life-time of each integrated circuit under a testing environment (see Boyington, column 4 lines 5-11), wherein an acceleration factor function (i.e. failure rate calculation) is related to the relationship between a testing time of the testing environment and a real time of a normal operating environment (see Boyington, column 3, lines 61-63 and column 4 lines 24-29); performing a transforming process using the acceleration factor function to

transform the testing time function into a real time function (see Boyington, column 3 line 61 – column 4 line 4); a knee point of the real time function corresponds to an operation time which is a best burn-in time (see Boyington, column 3 line 61 – column 4 line 4 and column 4 lines 8-23); and performing an integrating process by integrating a real time function through a calculating region to acquire an accumulated failure rate real time function, wherein the calculating region is a region in which the real time is larger than the best burn-in time (see Boyington, column 3 lines 40-47). Boyington does not disclose simulating a failure rate testing time relation, or simulating a failure rate real time relation.

Chien discloses simulating a failure rate real time relation (page 463, "III. Methods" and "B. Simulation").

It would have been obvious to one of ordinary skill in the art at the time the invention was made to modify Boyington to include the teachings of Chien, because simulating a failure rate real time relation that was transformed from a failure rate testing time function allows the skilled artisan to calculate the reliability (i.e. total costs and the mean residual lives) under different burn-in times (see Chien, page 463, "III. Methods").

Referring to claims 2 and 13, Boyington discloses a failure rate testing time relation divided into three periods: infant mortality, normal, and wear out (see Boyington, Figure 3 and column 4 lines 5-8).

Referring to claims 3-8, 14 and 15, Boyington teaches all the features of the claimed invention except for a function (i.e. acceleration factor function) as constant, linear, or nonlinear; nor does Boyington disclose a testing time function that is an exponent function, a polynomial, or "$y=at^b$".

Chien discloses an acceleration factor function that is constant, linear, and nonlinear; and a testing time function that is an exponent function, a polynomial, and in the form "$y=at^b$" (i.e., Equation (1) and Equation (3), which depending on the values of variables λ and β (i.e., "a") and "D" (i.e., "b"), will represent an acceleration factor that is constant, linear, or nonlinear, and a testing time function that is exponential, polynomial, or "$y=at^b$" (see Chien, pages 462-463, "A. U-Shaped Failure Rate Function" and "A. Generating a U-Shaped Failure Rate Curve"), because failure rate is related to testing time and the acceleration factor function.

It would have been obvious to one of ordinary skill in the art at the time the invention was made to modify Boyington to include the teachings of Chien, because having an acceleration factor function that is constant, linear, and nonlinear; and a testing time function that is an exponent function, a polynomial, and "$y=at^b$" allows the skilled artisan to calculate the failure rate in various regions of the failure rate curve including the constant failure rate region and the wear-out section (see Chien, page 463, "A. Generating a U-Shaped Failure Rate Curve").

Referring to claims 11 and 18, Boyington discloses all the features of the claimed invention except for stopping the integrating process when the testing time is located in the wear out period.

Chien discloses stopping the integrating process when the testing time is located in the wear out period.[i.e., "t_{L2}" is calculated (i.e., via an integration/summing process; page 463, A. Generating a U-Shaped Failure Rate Curve) to determine when the product starts to wear out (see Chien, page 463, "III. Methods")].

It would have been obvious to one of ordinary skill in the art at the time the invention was made to modify Boyington to include the teachings of Chien, because stopping the integrating process when the testing time is located in the wear out period would have allowed the skilled artisan to set a warranty plan and a construct a life-cycle model (see Chien, page 463, "III. Methods").

8. Claims 10, 16 and 17 are rejected under 35 U.S.C. 103(a) as being unpatentable over Boyington et al. (U.S. Patent No. 6,377,897) in view of Chien et al. and further in view of Tegethoff (U.S. Patent No. 5,539,652).

Referring to claims 10, 16 and 17, Boyington teaches all the features of the claimed invention except for adjusting the simulation to minimize error using the least squares method.

Tegethoff teaches adjusting the simulation to minimize error using the least squares method (see Tegethoff, column 29 lines 27-32).

It would have been obvious to one of ordinary skill in the art at the time the invention was made to modify Boyington and Chien to include the teachings of Tegethoff, because minimizing the error allows the skilled artisan to enhance the reliability of the simulation.

9. Claims 19 and 20 are rejected under 35 U.S.C. 103(a) as being unpatentable over Boyington et al. (U.S. Patent No. 6,377,897) in view of Chien et al. and further in view of Matsuoka (U.S. Patent No. 5,204,618).

Referring to claim 19, Boyington discloses providing a plurality of integrated circuits (see Boyington, column 3 lines 31-33); performing a life-time testing process, wherein the life-time of each integrated circuit is measured under a testing environment (see Boyington, column 4 lines 5-11) and a failure rate testing time relation is established in accordance with a plurality of testing records (see Boyington, column 4 lines 24-29), wherein an acceleration factor function is related to the relationship between a testing time of the testing environment and a real time of a normal operating environment (see Boyington, column 3 line 61 – column 4 line 4 and column 4 lines 8-23), and performing an optimization process where part of the testing records are deleted and the process is performed again while more than one integrated circuit is failed (see Boyington, column 3 lines 16-29 and column 4 lines 24-29). The Examiner notes that Boyington does not explicitly delete records, but rather a subset of prior records are used to optimize the determination of best burn-in time, which is functionally equivalent to the deletion of a portion of prior testing records/historical data.

Boyington further teaches performing a transforming process using the acceleration factor function to transform a specific testing time into a specific real time and transform a testing time polynomial into a real time polynomial (see Boyington, column 3 line 61 – column 4 line 4), wherein the specific real time corresponds to an operation time which is a best burn-in time for testing the integrated circuits (see Boyington, column 4 lines 8-23); and performing an integrating process by integrating a real time function through a calculating region to acquire an accumulated failure rate real time function (see Boyington, column 3 lines 40-47), wherein the calculating region is a region in which the real time is larger than the best burn-in time (see Boyington, column 4 lines 5-23). Boyington does not disclose simulating a failure rate testing time relation using a polynomial of the testing time; or determining a best testing time of the integrated circuits while only one of the integrated circuits has failed before a specific testing time.

Chien et al. discloses simulating a failure rate real time relation (see Chien, page 463, "III. Methods" and "B. Simulation").

Matsuoka discloses a monitored burn in system that has the capability of outputting an electrical signal when one of the integrated circuits fails, and calculating a cumulative failure rate, counting the cumulative number of failed integrated circuits at predetermined time intervals, and commanding burn-in to stop when a predetermined reference number of integrated circuits has failed (see Matsuoka, column 3 lines 10-38).

It would have been obvious to one of ordinary skill in the art at the time the invention was made to modify Boyington to include the teachings of Chien because

simulating a failure rate real time relation that was transformed from a failure rate testing time function allows the skilled artisan to calculate the total costs and the mean residual lives under different burn-in times (see Chien, page 463, "III. Methods"). It would further have been obvious to one of ordinary skill in the art to modify Boyington and Chien to include the teachings of Matsuoka because monitoring the burn-in process and stopping the procedure when a predetermined number of ICs have failed, would have allowed the skilled artisan to enhance the reliability of the burn-in procedures (see Matsuoka, column 1 lines 21-28).

Referring to claim 20, Boyington and Matsuoka teach all the features of the claimed invention except for stopping the integrating process when the testing time is located in the wear out period.

Chien discloses stopping the integrating process when the testing time is located in the wear out period.[i.e., "t_{L2}" is calculated (i.e., via an integration/summing process; (page 463, A. Generating a U-Shaped Failure Rate Curve) to determine when the product starts to wear out (see Chien, page 463, "III. Methods")].

It would have been obvious to one of ordinary skill in the art at the time the invention was made to modify Boyington and Matsuoka to include the teachings of Chien, because stopping the integrating process when the testing time is located in the wear out period allows the skilled artisan to set a warranty plan and a construct a life-cycle model (see Chien, page 463, "III. Methods").

Response to Arguments

10. Applicant's arguments filed on 21 May 2003 have been fully considered but they are not persuasive.

The Applicant further argues that Boyington et al. does not teach an acceleration factor function or a transformation between time scales. The limitation from claim 1, states that, "an acceleration factor is related to the relationship between a testing time of the testing environment and a real time of a normal operating environment". Boyington et al. teaches a core time (i.e. real time of a normal operating environment) calculated from historical data (i.e. testing time of the testing environment) and using this data calculations are made to determine whether or not burn-in should continue (i.e. acceleration factor) (see Boyington et al., column 3 lines 16-30). A further limitation of claim 1, teaches "a transformation using the acceleration factor function to transform the testing time function into a real time function". Boyington et al. teaches using the historical data (i.e. testing time) to generate a core time (i.e. real time) (see Boyington et al., column 3 lines 16-30).

Conclusion

11. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure.

(a) Gonzalez et al. teach diagnosis of faults on a circuit board.

(b) Winkler teaches a mobile terminal for a wireless telecommunications system with accurate real time generation.

(c) Cheong et al. teach a control system and method for semiconductor integrated circuit test process.

(d) Pagno et al. teach a method for real-time ultrasonic testing system.

12. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Mary Kate B Baran whose telephone number is (703) 305-4474. The examiner can normally be reached on Monday - Friday from 8:00 am to 5:00 pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Marc S Hoff can be reached on (703) 308-1677. The fax phone numbers for the organization where this application or proceeding is assigned are (703) 872-9318 for regular communications and (703) 872-9319 for After Final communications.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is (703) 308-1782.

MKB
August 1, 2003

MARC S. HOFF
SUPERVISORY PATENT EXAMINER
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